CLAIMS

WHAT IS CLAIMED IS:

1. An isolated nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO: 1 or complement thereof.

2. An isolated nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO: 2 or complement thereof.

3. An isolated nucleic acid encoding the amino acid sequence of SEQ ID NO: 3 or complement thereof.

4. A method for producing a GrB-NIC polypeptide, comprising:

   (a) transforming or transfecting a host cell with a nucleic acid comprising the nucleic acid sequence of SEQ ID NO: 1, to obtain a transformed or transfected host cell;

   (b) culturing the transformed or transfected host cell to obtain a cell culture;

   (c) expressing the nucleic acid in the transformed or transfected host cell to produce the polypeptide.

5. The method of claim 4, wherein the host cell is a prokaryotic cell.

6. The method of claim 4, wherein the host cell is a eukaryotic cell.

7. The method of claim 4, wherein said nucleic acid further comprises regulatory elements necessary to express GrB-NIC polypeptide in a eukaryotic host cell.

8. The method of claim 7, wherein said regulatory elements comprise native GrB-NIC regulatory elements.

9. A vector comprising a cloned nucleic acid, said cloned nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO: 1 or complement thereof.

10. A vector comprising a cloned nucleic acid, said cloned nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO: 2 or complement thereof.

11. A pharmaceutical composition, comprising a nucleic acid expression vector or expression cassette comprising a cloned nucleic acid, said cloned nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO: 1, in combination with a pharmaceutically acceptable carrier.

12. A pharmaceutical composition, comprising a nucleic acid expression vector or expression cassette comprising a cloned nucleic acid, said cloned nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO:2, in combination with a pharmaceutically acceptable carrier.

13. A method for identifying modulators of a GrB-NIC activity, comprising:

(a) incubating GrB-NIC and a candidate modulator;

(b) introducing a GrB-NIC substrate; and

(c) comparing the activity of GrB-NIC in the presence and absence of the modulator.

14. The method of claim 13, wherein said GrB-NIC activity is Asp-ase activity.

15. A method of inhibiting the expression of GrB-NIC comprising contacting tissues or cells which express GrB-NIC with an antisense compound, wherein said antisense compound inhibits GrB-NIC gene expression.

16. The method of claim 15, wherein said tissues or cells are non-hematopoietic.

17. The method of claim 15, wherein said tissues or cells are non-immune cell origins.

18. A method for screening for neurological disorders, comprising assessing GrB-NIC expression.

19. The method of claim 18, wherein said GrB-NIC expression is screened in neural cells.

20. The method of claim 18, wherein GrB-NIC expression is assessed by detecting mRNA encoding GrB-NIC.

21. The method of claim 18, wherein GrB-NIC expression is assessed by detecting GrB-NIC protein or polypeptide.

22. The method of claim 18, wherein said neurological disorder is a degenerative neurological disorder.

23. The method of claim 22, wherein said degenerative neurological disorder is an apoptosis based degenerative neurological disorder.

24. The method of claim 18, wherein said degenerative neurological disorder is selected from a group consisting of Alzheimer's Disease, Parkinson's disease, Huntington's chorea, multiple sclerosis, Progressive Supranuclear Palsy, Stiff-Person Syndrome and Transverse Myelitis.

25. A method for screening for autoimmune diseases, comprising assessing GrB-NIC expression in non-immune cells.

26. A method for screening for transplant rejection and graft-versus-host diseases, comprising assessing GrB-NIC expression in non-immune cells of grafted tissues and organs.

27. A method of inducing apoptosis in a cell comprising introducing a nucleic acid comprising a sequence encoding GrB-NIC into the cell under conditions permitting the expression of GrB-NIC so as to thereby induce apoptosis in the cell.

28. The method of claim 27, wherein the nucleic acid comprises a sequence encoding GrB-NIC with an internal deletion of the activation dipeptide Gly53-Glu54.

29. The method of claim 27, wherein the nucleic acid comprises a vector.

30. The method of claim 27, wherein the nucleic acid comprises naked DNA.

31. The method of claim 27, wherein the nucleic acid is introduced into the cell via a liposome.

32. The method of claim 27, wherein the nucleic acid is introduced into the cell via an antibody-coated liposome.

33. The method of claim 27, wherein the nucleic acid is introduced into the cell via a mechanical means.

34. The method of claim 27, wherein the nucleic acid is introduced into the cell via an electrical means.

35. The method of claim 27, wherein said cell is a cancer cell.

36. The method of claim 27, wherein said cell is a non-immune cell.

37. The method of claim 27, wherein said cell is infected with a virus.

38. A method of detecting cells in an apoptotic or pre-apoptotic state comprising assessing GrB-NIC expression.

39. The method of claim 38, wherein said cell is a non-immune cell.

40. The method of claim 38, wherein GrB expression is assessed by detecting RNA encoding GrB-NIC.

41. The method of claim 38, wherein GrB expression is assessed by detecting GrB-NIC protein or peptide.

42. A polypeptide, consisting essentially of the amino acid sequence of SEQ ID NO: 3.

43. A method of modulating endogenous GrB-NIC expression, comprising regulating the expression of a tumor suprressor gene.

44. The method of claim 43, wherein said tumor suppressor is pRB.

45. The method of claim 43, wherein said tumor suppressor is p53.

46. A method of modulating intracellular trafficking of endogenous GrB-NIC, comprising administering a composition comprising adenovirus.

47. A gene therapy agent comprising:

an expression construct and

a nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO:2 or SEQ ID NO:1 or complement thereof.

48. The gene therapy agent of claim 47, wherein said expression construct is a viral vector.

49. A method of treating a cancer comprising, administering an expression construct to a patient, wherein said expression construct comprises a nucleic acid consisting essentially of the nucleic acid sequence of SEQ ID NO:2 or SEQ ID NO:1 or complement thereof.

50. The method of claim 49, wherein said cancer is selected from a group consisting of breast cancer, osteosarcoma, prostate cancer, bladder cancer, ovarian cancer and lung cancer.

51. A method of inhibiting GrB-NIC comprising contacting tissues or cells which express GrB-NIC with an composition comprising SPI-6, wherein said SPI-6 inhibits GrB-NIC enzymatic activity.

52. The method of claim 51, wherein said tissues or cells are of non-hematopoietic origins.

53. The method of claim 51, wherein said tissues or cells are human neural cell lineages.

54. The method of claim 51, wherein said tissues or cells are embryonic stem cells.

55. A method of inhibiting GrB-NIC comprising contacting tissues or cells which express GrB-NIC with an composition comprising PI-9, wherein said PI-9 inhibits GrB enzymatic activity.

56. The method of claim 55, wherein the said tissues or cells are of non-hematopoietic origins.

57. The method of claim 55, wherein the said tissues or cells are human neural cell lineages.

58. The method of claim 55, wherein the said tissues or cells are embryonic stem cells.

59. A method of blocking surface expression of GrB-NIC comprising contacting tissues or cells which express GrB-NIC with an composition comprising SPI-6, wherein said SPI-6 inhibits GrB-NIC surface expression.

60. A method of blocking surface expression of GrB-NIC comprising contacting tissues or cells which express GrB-NIC with an composition comprising PI-9, wherein said PI-9 inhibits GrB-NIC surface expression.

61. A method for identifying modulators for GrB-NIC expression, comprising:

(a) incubating a cell comprising the nucleic acid sequence of SEQ ID NO: 1 or SEQ ID NO:2;

(b) contacting said cell with a candidate modulator; and

(c) assaying GrB-NIC expression in said cell.

62. The method of claim 61, wherein said cell comprises an expression

construct comprising the nucleic acid sequence of SEQ ID NO: 1 or SEQ ID NO:2.

63. The method of claim 61, wherein said cell is a non-immune cell.

64. A method for identifying modulators of a GrB-NIC expression,

comprising:

(a) incubating a cell comprising the nucleic acid sequence of SEQ ID NO: 1 or SEQ ID NO:2;

(b) contacting said cell with a candidate modulator; and

(c) assaying GrB-NIC transcription in said cell.

65. The method of claim 64, wherein said cell comprises an expression construct comprising the nucleic acid sequence of SEQ ID NO: 1 or SEQ ID NO:2.

66. The method of claim 64, wherein said cell is a non-immune cell.

67. A method of inhibiting GrB-NIC comprising contacting tissues or cells which express GrB-NIC with a modulator, wherein said modulator inhibits GrB-NIC gene expression.

68. The method of claim 67, wherein the said tissues or cells are non-hematopoietic origins.

69. The method of claim 67, wherein the said tissues or cells are human neural cell lineages.

70. The method of claim 67, wherein the said tissues or cells are embryonic stem cells.

71. A method of inhibiting apoptosis in cultured stem cells by introducing a modulator to inhibit GrB-NIC expression.

72. The method of claim 71, wherein said modulator is SpI-6.

73. The method of claim 71, wherein said modulator is PI-9.

74. A cell resulting from the differentiation of stem cells cultured in the presence of a differentiation factor and a modulator to inhibit GrB-NIC expression.

75. A cells resulting from the differentiation of progenitor cells cultured in the presence of a differentiation factor and a modulator to inhibit GrB-NIC expression.